

REMARKS

Claims 27-43 have been added as supported by the specification and claims as originally filed. No new matter has been added.

Claims 1, 4-7, 10-14, 16-18, 20, 21 and 23-43 are pending.

Applicants wish to thank Examiner Metzmaier for the helpful discussion on January 7, 2011. The four (4) Declarations that were filed after appeal and possible claim amendments were discussed. The new claims reflect many of the claim limitations that were discussed. New Claim 27 is a process claim.

The **four Declarations** show the following:

- 1) The Declaration filed May 7, 2010 by Dr. Thomas Daniel shows the preparation of a dried hydrogel according to the present invention.
- 2) The Declaration filed May 10, 2010 by Dr. Volker Braig shows the preparation of the comparative examples according to WO '195. Sample [1] mixes SAP, silicate and zeolite in powder form. Sample [2] uses an aqueous solution of silicate.
- 3) The two (2) Declarations filed April 9, 2010 by Dr. Manfred Essig show discuss the SEM and EDX data obtained for the samples prepared by Dr. Daniel and Dr. Braig.

Full consideration of the declarations is requested.

Claims 1, 10, 18, 25, 26 and 27 are independent. Claims 1 and 18 and 25 relate to a dried hydrogel and Claims 10 and 26 and 27 relate to a method of making a hydrogel.

In Claims 25 and 26 the admixing with the alkali metal silicate is before or during polymerization.

New Claim 27 relates to a process for preparing dried hydrogel particles, each particle comprising a water-insoluble carboxylate polymer which comprises a polysilicate matrix and being capable of a swelling and absorbing an aqueous fluid and retaining the absorbed fluid under a certain pressure;
said process comprising
polymerizing an olefinically unsaturated carboxylic acid or its salts in a polymerization reaction mixture;
admixing the polymerization reaction mixture, before, during or after the polymerization and before drying, with an alkali metal silicate of the general formula I



wherein M is an alkali metal and n is from 0.5 to 4;

postcrosslinking a resulting polymer in which said silicate is evenly distributed;
thereby obtaining a hydrogel containing said postcrosslinked polymer; and
drying said hydrogel at an elevated temperature, to obtain said dried hydrogel;

wherein said postcrosslinking is effected by a crosslinker which is a compound containing two or more groups that form covalent bonds with the carboxyl groups of said polymer.

New Claims 29-31 relate to the silicate addition before, during and after polymerization, respectively.

The independent claims contain language relating to even distribution of silicate throughout the polymer. The combined cited references do not disclose or suggest such limitation. In addition, the amount of alkali metal silicate has been limited to 0.05% by weight to 20% by weight, reckoned on SiO₂ and based on a total monomer weight.

In addition, the combined references do not disclose or suggest the process of Claim 27 in which **each particle comprises a water-insoluble carboxylate polymer which comprises a polysilicate matrix. The subject matter of new Claims 28-43 is not disclosed or suggested either.**

Further, the AGM in P&G's examples is a polyacrylate which is crosslinked before adding the silicate. See the Example 5. In contrast, in the present claims the silicate is added before post-crosslinking. The Examples already on the record which use the post-crosslinking show that silicate addition to polymer before crosslinking makes a significant difference.

Procter & Gamble, Trinh et al and Modern Superabsorbent Polymer Technology fail to disclose or suggest, alone or in combination, a dried hydrogel as claimed or a process of preparing a dried hydrogel as claimed in which a **polymerization reaction mixture**, before, during or after the polymerization and **before drying, is admixed with an alkali metal silicate**. In addition, Procter & Gamble, Trinh et al lack a disclosure of **post-crosslinking**.

Procter & Gamble discloses an odour control system with silica, AGM and zeolites (page 6, 2nd paragraph). The term “AGM” means absorbent gelling material and is used as synonym for dried hydrogels or superabsorbent polymers. However, **AGM is not a polymerization mixture before drying.** AGM is a dried hydrogel. **Since AGM is already a ready made hydrogel which is dried it is impossible to perform a step in Procter & Gamble in which a polymerization mixture is mixed with an alkali metal silicate before drying. Therefore such step is not suggested or motivated.**

Further, Procter & Gamble discloses that in one embodiment, the odour control system is produced using spray drying, spray mixing or agglomeration (page 6, last paragraph). **These techniques relate to the processing of AGM with binder materials such as silica.** However, there is **no disclosure or suggestion that a polymerization mixture before drying be used and admixed with the alkali metal silicate.**

Similarly, Example 9 of Trinh et al relates to mixing of AGM with zeolite. Example 9 and col. 16, line 47 et seq. do not provide a disclosure or suggestion that a

polymerization mixture before drying be used and admixed with the alkali metal silicate.

Moreover, in Procter & Gamble the silica acts as a binder (page 6, last paragraph) for the AGM particles. However, the silica is **NOT INSIDE THE AGM** particles but is outside the particles to make them bind. This is consistent with the fact that, as stated above, AGM is a ready made dried hydrogel that is mixed with the binder but not in such a way that the binder goes inside the AGM particles.

According to Procter & Gamble, the silica can be distributed homogeneously throughout the absorbent article (page 7, fourth paragraph). **This refers to the entire absorbent article not to a distribution within AGM particles.** Absorbent articles are i.e. sanitary napkins (page 1, first paragraph of Procter & Gamble) and are not the superabsorbent particles themselves. Just because the articles have a distribution of silicate on macroscale, does not mean that the single AGM particles contained in the article have silicate distributed therein. The silicate in Procter & Gamble is a binder and thus sits outside the AGM particles to bind them. If the silicate was inside the AGM particles how would it bind them?

Further, Applicants wish to draw the Examiner's attention to page 6, 1st paragraph, of Procter & Gamble, which states that the odour control system may comprise in addition to silica, additional odour control agents such as zeolites. In other words, mixtures of silica and zeolite are what Procter & Gamble discloses. In paragraph 3 at page 6 of Procter & Gamble, AGM is used together with silica and zeolite.

However, paragraph 3 at page 6 of Procter & Gamble refers to a different embodiment. The particulates, granulates, flakes, noodles, and exudates (page 6, third paragraph) refers to mixtures of silica and zeolite only. There is no AGM in this mixture. Notably, this paragraph refers to a different embodiment than paragraph 2 at page 6 of Procter & Gamble. This disclosure does not mean particles comprising superabsorbent polymers having silica inside.

In the present invention, as a result of mixing the polymerization mixture with the alkali metal silicate **before drying**, the alkali metal silicate is necessarily distributed inside the particles of the gel that are obtained. This is evidenced by the Declaration of Dr. Manfred Essig on record. Thus, the dried hydrogel particles of the present invention are different form the AGM particles or the sanitary napkins of Procter & Gamble. While it is clear from Procter & Gamble that the AGM does not include silica inside, the Declaration shows that the dried hydrogel has silica distributed inside. Thus, it has been established that the dried hydrogel of the present invention is **patentably distinct** from the odour control system of Procter & Gamble.

Procter & Gamble refers to crystalline and amorphous silica that means particulate silica, only (page 5, second paragraph). **By mixing of different particulate materials it is impossible to get particles wherein the one material is distributed throughout the other material.** Thus, Procter & Gamble does not disclose a distribution of silica throughout the superabsorbent polymer particles (AGM).

Trinh et al discloses mixtures of superabsorbent particles and zeolite (column 25, lines 35-40). Kieselguhr can also be used (column 2, line 38). As shown in Kirk-Othmer "Encyclopedia of Chemical Technology", "Kieselguhr" is a synonym for diatomite (page 109, first paragraph) and diatomite is a particulate material (page 108, first paragraph). **By wet mixing of different particulate materials it is impossible to get particles wherein the one material is distributed throughout the other material.** It is clear to a person of ordinary skill in the art that in case of wet mixing, the particles would still be adjacent to each other and not one inside the other. That means that Trinh et al does not disclose a distribution of silica throughout the superabsorbent polymer particles.

Further, a person skilled in the art had no motivation to replace a porous silica or silicate with a high surface area (Procter & Gamble, page 5, 2nd and 3rd paragraphs) by an alkali metal silicate solution. Solvated alkali metal silicates cannot have any pores.

Modern Superabsorbent Polymer Technology has only been cited to show post-crosslinking and does not cure the defects of Procter & Gamble in view of Trinh et al.

Even if Procter & Gamble, Trinh et al and Modern Superabsorbent Polymer Technology are combined, the present invention cannot result.

In the process of **Claim 10**, admixing of the polymerization reaction mixture is before or during the polymerization or admixing the solid gel with an alkali metal silicate of the general formula I, $M_2O \times n SiO_2$ (I), occurs.

The admixing of the polymerization mixture with alkali metal silicate has been discussed above for Claim 1 and applies here as well.

Regarding the phrase “solid gel”, Applicants wish to note the following. A solid gel does not mean that the same is dry. In fact, it is well known that a gel has a high water content. See also Modern Superabsorbent Polymer Technology at page 85 (bottom) referring to a “pasty material”, page 86 (top), referring to a “rubbery gel” and page 87 (bottom) “2.5 kg water must be removed for 1 kg of polymer” and the figure at page 91.

Thus, a person of ordinary skill in the art would know that the water content of a solid gel is high.

Further, the admixing the solid gel with an alkali metal silicate is followed by post-crosslinking. Procter & Gamble, Trinh et al lack a disclosure of post-crosslinking. While Modern Superabsorbent Polymer Technology generally discloses the use of post-cross-linking, there is no disclosure that a compound such as a alkali metal silicate is first mixed with a polymer to be post-crosslinked. However, it makes a big difference to the structure of the product obtained. Clearly, a polymer that is post-crosslinked as disclosed in Modern Superabsorbent Polymer Technology (**without being first admixed with a compound**) is different from a polymer particle

as obtained in the present invention in which a alkali metal silicate is distributed inside the polymer particle and which is then post-crosslinked.

Even if Procter & Gamble, Trinh et al and Modern Superabsorbent Polymer Technology are combined, the present invention as claimed in Claim 10 cannot result.

Procter & Gamble, Trinh et al and Modern Superabsorbent Polymer Technology, alone or in combination do not suggest the superior results of the present invention obtained when using sodium silicate solution followed by surface post-crosslinking.

Regarding Claim 18, the admixing the solid gel with an alkali metal silicate is followed by post-crosslinking. Procter & Gamble, Trinh et al lack a disclosure of post-crosslinking. While Modern Superabsorbent Polymer Technology generally discloses the use of post-cross-linking, there is no disclosure that a compound such as a alkali metal silicate is first mixed with a polymer to be post-crosslinked. However, it makes a big difference to the structure of the product obtained. Clearly, a polymer that is post-crosslinked as disclosed in Modern Superabsorbent Polymer Technology (without being first admixed with a compound) is different from a polymer particle as obtained in the present invention in which a alkali metal silicate is distributed inside the polymer particle and which is then post-crosslinked.

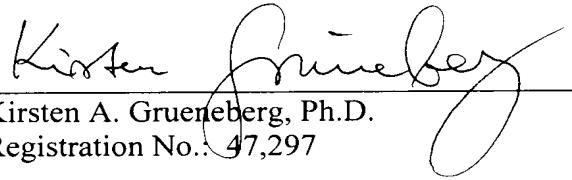
Even if Procter & Gamble, Trinh et al and Modern Superabsorbent Polymer Technology are combined, the present invention as claimed in Claim 18 cannot result.

For the above reasons, it is respectfully requested that the rejections on record be withdrawn.

This application presents allowable subject matter, and the Examiner is kindly requested to pass it to issue. Should the Examiner have any questions regarding the claims or otherwise wish to discuss this case, he is kindly invited to contact Applicants' below-signed representative, who would be happy to provide any assistance deemed necessary in speeding this application to allowance.

Respectfully submitted,

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